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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Ulf Dahl                          Art Unit : 2132  
 Serial No. : 09/840,188                      Examiner : Jung W. Kim  
 Filed : April 24, 2001  
 Title : DATA SECURITY SYSTEM FOR A DATABASE

**Mail Stop Appeal Brief - Patents**  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

REPLY BRIEF

Pursuant to 37 C.F.R. § 41.41, the Applicant responds to the Examiner's Answer as follows.

**I. The Examiner's arguments in response to those of the Applicant are not persuasive.**

The Examiner, in the Answer, characterized the Applicant's argument into five groups, and responded to four of them in turn, stating that the fifth was addressed by the others. Without conceding whether the Examiner's characterization of the Applicant's argument is accurate, the Applicant uses the same letter designations as the Examiner.

**(A) The Cited Art Fails to Disclose "Maintaining, Separate from the Table of Data, Information for Controlling Access to a Specified Proper Subset" of Data.**

The Applicant disagrees with the Examiner's assertion that in *Thomson*, "the security table joined with a particular access view meets this limitation, i.e. that the security table joined with the particular access view controls access to a **specified proper subset**."<sup>1</sup> The security table in *Thomson* does not control access to a "specified proper subset." Rather, it controls access to **the entire table**, granting access to individual users to access portions of the table. This is different from controlling access to a specified proper subset of data, as would be the case, for

<sup>1</sup> *Answer*, p. 20.

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example, where access to certain columns in a table is provided to the public, while access to other columns is restricted. In this example, only access to the “restricted” columns is controlled.

As to *Denning*, the Examiner makes two arguments: that “the master key is information that is maintained ‘for controlling access to a specified proper subset of data in the table,’” and that distinguishing “calculated” keys from “maintained” keys “undermines the examination directive for the broadest reasonable interpretation of the claims.”<sup>2</sup> The Applicant disagrees with both arguments.

The Examiner states that “in the case of the claim limitation in question, a key that controls access to the entire table necessarily controls access to a specified proper subset of data in the table.”<sup>3</sup> This would render the claim language “specified proper subset” meaningless. Although the Examiner may apply the broadest reasonable meaning of a term, this does not amount to a license to ignore a term altogether. In fact, “[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art.”<sup>4</sup>

Moreover, the broadest reasonable meaning “must also be consistent with the interpretation that those skilled in the art would reach.”<sup>5</sup> In this case, the Examiner’s proposed interpretation of “proper subset” is decidedly inconsistent with how that phrase would be understood by one of ordinary skill in the art. In fact, the opposite is true: the use of the term “proper subset” necessarily excludes something that controls access to the table as a whole. For example, one meaning of “proper” is that of “being a mathematical subset (as a subgroup) that does not contain all the elements of the inclusive set from which it is derived.”<sup>6</sup>

The Examiner also argues that “maintained” things include things that are merely “calculated.” To support this, the Examiner turns to the dictionary, and asserts that “maintaining ... is equivalent to: providing for, supporting or keeping in existence ...”<sup>7</sup> None of these suggested meanings, however, include calculating something, that is “to ascertain by

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<sup>2</sup> *Answer*, pp. 20-21.

<sup>3</sup> *Id.*, p. 20.

<sup>4</sup> *In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970).

<sup>5</sup> *In re Cortright*, 165 F.3d 1353 (Fed. Cir. 1999).

<sup>6</sup> *Webster's 9th New Collegiate Dictionary*, 1990

<sup>7</sup> *Id.*, p. 21.

computation; reckon; to make an estimate of; evaluate," etc.<sup>8</sup> The definition cited by the Examiner does not reasonably support the breadth necessarily for the conclusion that "calculating' keys falls under the umbrella of 'maintaining' information."<sup>9</sup>

In fact, the Examiner's assertion that maintaining means "keeping in existence" is inconsistent with the reality that the act of calculation brings into existence a result that was not there before. Calculation is thus a creative act that is inconsistent with "maintaining" a status quo.

**B. The Cited Art Fails to Disclose that "The Information for Controlling Access," Which is Maintained Separately from the Table, "Comprises Encrypted Information."**

The Applicant and the Examiner have cited the same portion of *Abraham* in support of conflicting arguments as to whether *Abraham* discloses storing the encrypted keys separately from the table. A close reading of the cited passage, however, supports Applicant's view:

Keys are stored on **PC disk memory in encrypted form**, encrypted under the master key of one of the security devices. [sic] cryptographic adapter 29, card reader 17, or IC card 19. **Keys are also stored** in the nonvolatile memories of cryptographic adapter 29, card reader 17, and IC card 19.<sup>10</sup>

The Applicant assumes the period after "devices" was intended to be either a comma or a colon. Accordingly, the Applicant interprets this to state that the *encrypted* keys are stored in PC disk memory, and that a master key can be obtained from any device in the list of security devices. Storing encrypted keys on PC disk memory is not the same as teaching that encrypted keys are stored separately from the table. As the Applicant argued in the Appeal Brief,<sup>11</sup> *Abraham* is, at best, inconclusive concerning whether the encrypted key is stored with a table or separately from a table which is also stored on the PC disk memory.

The second sentence states only that "*Keys are also stored*" in the other devices – not that *encrypted* keys are stored there, as the previous sentence stated for PC disk memory, and as the

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<sup>8</sup> See [www.dictionary.com](http://www.dictionary.com), from *The American Heritage dictionary of the English Language*, 4th ed., Houghton Mifflin Co., 2000.

<sup>9</sup> See *Id.*

<sup>10</sup> *Abraham*, col. 7, lines 45-50, emphasis added.

<sup>11</sup> *Appeal Brief*, pp. 13-14.

claim requires. As *Abraham* only discloses one place where the *encrypted* keys may be stored, and it is unclear whether this includes storing the keys separately from the table or as part of it, *Abraham* cannot support a *prima facie* showing of obviousness.

**C.     *Thomson, Denning, and Gaskell Fail to Disclose the Various Limitations of the Dependent Claims.***

In section V of the Appeal Brief<sup>12</sup>, the Applicant argued that the rejections of various dependent claims are improper for the reasons set forth earlier in the Brief with respect to the claims upon which they depend. In addition, the Applicant argued that *Gaskell* discloses neither the additional elements set forth in these dependent claims nor the items the Applicant argues are lacking in *Thomson* and *Denning*.

The Examiner responds by stating that “One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references.”

However, when none of the cited references disclose specific limitations of the claims, no holistic combination of the references can make up that deficiency. A combination of the references cannot support a *prima facie* case of obviousness if a claim limitation is not found in *any* of the references.<sup>13</sup> The only reasonable way to show that an element is absent from each of the references is to address them one at a time. In this case, the Applicant had already shown how certain elements were lacking from *Thomson* and *Denning* in the parent claims, so it is entirely appropriate that the Applicant explains only why *Gaskell* also lacks those elements. *Gaskell* may “disclose[] using smart cards to store cryptographic keys,”<sup>14</sup> the reason for which it was added to the string of references, but it fails to disclose numerous other claim limitations that the Applicant has already shown to be absent from *Thomson* and *Denning*, as argued in the Appeal Brief.

**D.     *Denning Fails to Inherently Disclose Storing First and Second Cryptographic Information Outside the Table.***

The Applicant argued in the Appeal brief that the Examiner’s argument that *Denning* inherently discloses storing cryptographic information outside the table is flawed, because: (1)

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<sup>12</sup> *Id.*, pp. 15-19.

<sup>13</sup> *In re Royka*, 490 F.2d 981 (CCPA 1974).

<sup>14</sup> *Answer*, p. 22.

*Denning* does not disclose where the cryptographic information is stored, and (2) the cryptographic information can just as easily be stored inside the table as outside.<sup>15</sup>

In reply, the Examiner attempts to present a “proof by contradiction” that *Denning* “does in fact teach or suggest that the cryptographic information is not stored in the data table.”<sup>16</sup> The Examiner’s purported “proof,” however, relies on a flawed assumption that disregards the basis of the Applicant’s counter example. The Examiner states: “Proposition 1: *the master key is encrypted. Since any sensitive values of the table are accessible, all sensitive values must be encrypted.* The master key is a sensitive value. Therefore, the master key is encrypted.”<sup>17</sup> However, the assumption that “any sensitive values of the table are accessible” is not supported. As the Applicant previously argued,

A system according to *Denning*, in which the master key is stored inside the table, would be useful, for example, in a database system in which only two levels of access were permitted: administrator and user. The database administrator might have full confidence in the access control mechanism’s ability to preclude intruders from logging in as “administrator,” perhaps because the administrator would only be permitted to log in from a local console. But the administrator might wish to restrict access to individual users. The solution, in this example, might be to store a *Denning* master key in the same table as the sensitive data, but to specify that it may only be accessed by an administrator. Then, the master key could be used in the manner specified by *Denning* to encrypt individual data elements within the rest of the table.<sup>18</sup>

Thus, there exist conditions in which **sensitive values of the table are not accessible** to those who should not access them, without any encryption. Since one of the starting assumptions of the Examiner’s “proof” is false, the entire proof fails to rebut the Applicant’s counter example. Since *Denning* equally supports both possible locations of the cryptographic information, it cannot be said to inherently disclose this limitation. As the Applicant pointed out in the Appeal Brief,<sup>19</sup> both the Board of Appeals and the Federal Circuit have held that a finding

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<sup>15</sup> *Appeal Brief*, pp. 8-10.

<sup>16</sup> *Answer*, p. 23.

<sup>17</sup> *Id.*, p. 24, emphasis added.

<sup>18</sup> *Appeal Brief*, p. 9.

<sup>19</sup> *Id.*, p. 8.

of inherency requires that the “allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art.”<sup>20,21</sup>

The Examiner also disputes the Applicant’s argument<sup>22</sup> that *Denning* fails to disclose “storing first *and second* cryptographic information outside the table.”

First, the Examiner maintains that the master key is both the first and second cryptographic information.<sup>23</sup> Even if it is reasonable to construe the claim such that a single item can be both the first and second cryptographic information, *Denning* does not disclose that the master key is stored outside the table, as argued above.

Second, the Examiner maintains that “the field keys disclosed by *Denning* also cover the limitation” on the grounds that *Denning* discloses the use of the field keys in DES, which would “require[] the temporary buffer of key values.”<sup>24</sup> But “storing” requires more than an ephemeral presence. Any data used in a computer system must be buffered or otherwise transiently held in memory, caches, registers, and the like. If “storing” were construed to encompass all these activities, it would render the term meaningless in any claim directed to a computer-related process. The requirement for broad interpretations of claims during prosecution cannot support a claim construction that would render the operational verb of a limitation meaningless.<sup>25</sup>

## **II. The Examiner’s new grounds for rejection are not supported by the facts.**

The Examiner now rejects claims 48-54 and 86-92, “under [§] 101 as claiming a data structure that does not define any structural and functional interrelationships...”<sup>26</sup> In particular, the Examiner stated that “no functional interrelationship between the data structure and the information is defined. The portion of the claim ‘for controlling access to at least one column of data’ merely describes an intended use and does not narrow the scope of the claim.”<sup>27</sup> The Applicant disagrees.

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<sup>20</sup> *Ex parte Levy*, 17 USPQ 2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) [emphasis in original].

<sup>21</sup> see *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999).

<sup>22</sup> *Id.*, pp. 7-8.

<sup>23</sup> *Answer*, p. 25.

<sup>24</sup> *Id.*

<sup>25</sup> *In re Cortright, supra*.

<sup>26</sup> *Answer*, p. 16.

<sup>27</sup> *Id.*

Unlike the claims invalidated in *In re Warmerdam*, claim 48 is directed to “[a] database management system,” not to a data structure *per se*.<sup>28</sup> Contrary to the examiner’s assertion, the database and information comprising the claimed system are indeed described in a manner that “define[s] structural and functional interrelationships between [them].”<sup>29</sup> For example, “a database containing a table . . . and information stored outside of the table” is clearly a structural interrelationship between the elements of the claimed system. It is an effective limitation as it excludes systems having the information stored *inside* the table. Likewise, “[the] table having at least two columns of data” and “[information] for controlling access to at least one column of data” is clearly a functional interrelationship between the data structure and the information. As this recitation of the elements’ function rules out some kinds of data (e.g., information defining today’s lunch menu is not information for controlling access to at least one column of data), it too is an effective structural limitation. Claim 48 is to a database management system, and that system is given functionality by the data structure and information that comprise it.<sup>30</sup>

Claim 86 recites limitations similar to those recited in claim 48 and is patentable for the same reasons. Claims 49-54 and 87-92 are patentable for at least the same reasons as the claims on which they depend, as well as for the reasons presented above and in the Appeal Brief with regard to the substantive limitations of the claims.

### III. Conclusion

The Examiner’s response to the Applicant’s arguments are not persuasive. The new grounds of rejection offered by the Examiner are not supported by the facts. For these reasons, and the reasons stated in the Appeal Brief, the Applicant submits that the final rejection should be reversed.

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<sup>28</sup> see *In re Warmerdam*, 33 F.3d 1354, 1361.

<sup>29</sup> *Id.*

<sup>30</sup> see *In re Lowry*, 32 F.3d 1579 (Fed. Cir. 1994).

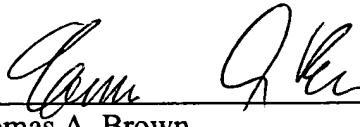
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